

CLAIMS

1. A method for rendering smooth teletext graphics when an input teletext page (D) is to be displayed at a target resolution on a device, characterized in that it comprises the steps of:
- 5 – separating (100, 100') non-text information and text information composing the input teletext page in order to give, as output, an intermediate non-text bitmap (D5) at an intermediate resolution and a final text bitmap (D4) at said target resolution;
 - 10 – scaling up (200, 200') the intermediate non-text bitmap (D5) to obtain a final non-text bitmap (D7) at said target resolution, using an advanced up-scaling algorithm; and,
 - merging (300) the final non-text bitmap (D7) and the final text bitmap (D4) in order to give an output of a rendered bitmap (D) having the target resolution.
2. A method as claimed in claim 1, characterized in that the step of
- 15 scaling up (200) said intermediate non-text bitmap (D5) comprises the sub-steps of:
- obtaining (201) a luminance plane (D2) from said intermediate non-text bitmap (D5);
 - scaling up (202) to said target resolution said luminance plane (D9) in order to get an up-scaled luminance plane (D11), using said advanced up-scaling
 - 20 algorithm; and,
 - mapping (203) each pixel of said up-scaled luminance plane (D11) with one color identifier of a plurality of color identifiers in order to obtain said final non-text bitmap (D7).
- 25 3. A method as claimed in claim 2, characterized in that said mapping sub-step (203) uses said intermediate non-text bitmap (D5) as an input for improving the mapping process.
4. A method as claimed in claim 1, characterized in that the step of
- 30 scaling up (200') said intermediate non-text bitmap comprises the sub-steps of:
- separating (210) said intermediate non-text bitmap (D5) into a plurality of color planes (D13R, D13G ...);

- scaling up (211R, 211G ...) separately to said target resolution each color plane (D13R, D13G ...) of said plurality of color planes (D15R, D15G ...) to obtain a plurality of up-scaled color planes, using said advanced up-scaling algorithm; and,
- 5 – merging (212) said plurality of up-scaled color planes (D15R, D15G ...) in order to obtain said final non-text bitmap (D7).

5. A method as claimed in claim 4, characterized in that it further comprises the sub-step (213) of scaling up classically said intermediate non-text
10 bitmap (D5) in order to obtain a classical up-scaled non-text bitmap (D17) having said target resolution by using a classical up-scaling algorithm based on pixel repetition, and said merging sub-step (212) uses said classical up-scaled non-text bitmap (D17) as an input for improving the merging process.

15 6. A method as claimed in any one of claims 1 to 5, characterized in that said separating step (100) comprises the sub-steps of:

- filtering (101) said input teletext page (D1) into a non-text item (D3) and a text item (D2);
- rendering (102) said non-text item (D3) into said intermediate non-text bitmap
20 (D5) at said intermediary resolution; and,
- rendering (103) said text item (D2) into said final text bitmap (D4) at said target resolution.

25 7. A method as claimed in any one of claims 1 to 5, characterized in that said separating step (100') comprises the sub-steps of:

- converting (110) said input teletext page (D1) into an initial teletext bitmap (D25) having the target resolution;
- filtering (111) said initial teletext bitmap (D25) into an initial non-text bitmap (D30) and a final text bitmap (D4); and,
- 30 – downscaling (112) said initial non-text bitmap (D30) from said target resolution to said intermediate resolution in order to give an output of said intermediate non-text bitmap (D5).

8. An apparatus for rendering smooth teletext graphics when an
35 input teletext page (D1) is to be displayed at a target resolution on a device, characterized in that it comprises:

- separation means (100, 100') for separating the input teletext page (D1) into an intermediate non-text bitmap (D5) at an intermediate resolution and a final text bitmap (D4) at said target resolution;
- up-scaling means (200, 200'), using an advanced up-scaling algorithm for scaling up said intermediate non-text bitmap (D5) from the intermediate resolution to said target resolution, and giving an output of a final non-text bitmap (D7);
- merging means (300) for merging said final non-text bitmap (D7) from said up-scaling means (200, 200') with said final text bitmap (D4) from said separation means (100, 100') in order to give an output of a rendered bitmap (D) at said target resolution.

9. An apparatus as claimed in claim 8, characterized in that said up-scaling means (200) comprises:

- luminance means (201) for obtaining a luminance plane (D9) from said intermediate non-text bitmap (D5);
- advanced up-scaling means (202), based on an advanced up-scaling algorithm for up-scaling to said target resolution said luminance plane (D9) given by said luminance means (201); and,
- mapping means (203) for mapping each pixel of the up-scaled luminance plane (D11) given by said advanced up-scaling means (202) with one color identifier of a plurality of color identifiers in order to obtain said final non-text bitmap (D7).

10. An apparatus as claimed in claim 8, characterized in that the up-scaling means (200') comprises:

- color separation means (210) for separating said intermediate non-text bitmap (D5) into a plurality of color planes (D13R, D13G ...);
- advanced up-scaling means (211R, 211G ...) based on an advanced up-scaling algorithm for separately up-scaling to said target resolution each color plane of said plurality of color planes (D13R, D13G ...); and,
- merging means (212) allowing merging of the plurality of up-scaled color planes (D15R, D15G ...) given by said advanced up-scaling means (211r, 211G ...) to calculate said final non-text bitmap (D7).